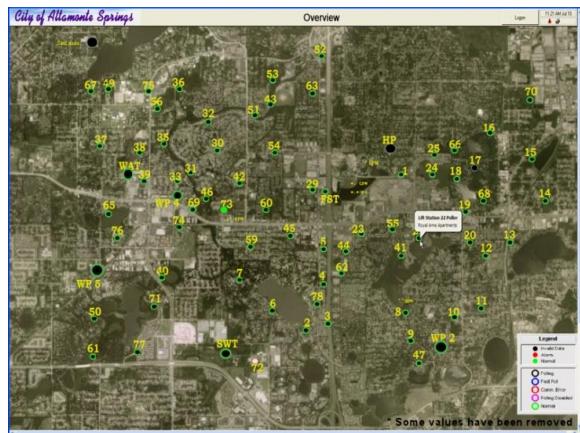


How do you know when you've found the right SCADA Software?

The Story of Altamonte Springs, FL

By Christopher Little

The City of Altamonte Springs is located just north of Orlando, Florida, and is home to over 43,000 people. The City's Water Distribution and Wastewater Collections Division is responsible for the operation of a twenty-five million gallon-per-day capacity aerobic wastewater treatment plant, four water treatment plants and approximately eighty lift stations spread out across the city.



Mark Utesch is the Instrumentation Technician responsible for the Division's Supervisory Control and Data Acquisition (SCADA) software application. "There are three of us plus a supervisor in this work group. Together we make the electronics and instrumentation used throughout the plants and lift stations. My specific focus is the SCADA system. It monitors things like dissolved oxygen, turbidity, flows at various points throughout the plant and the residual amounts of the chlorine we use for disinfection."

The treated wastewater from the facility is used to significantly offset the impact of public irrigation on the City's water supply. "As a general rule we don't process enough wastewater to meet all the City's irrigation needs, but the water table is not being robbed like it normally would if everyone were just using potable water. It's a good system."

In the summer of 2000, Utesch had just finished configuring a new SCADA application using a new software product when he received some unwelcome news. "I had put in a lot of extra time trying to do some things that were not possible with that software at the time. I finally got everything functioning just the way I wanted it. Then my supervisor came in and said, 'Well, we are going to look at this other software.' I thought, you can look all you want but I'm not putting it in." Soon after, the Water Distribution and Wastewater Collections Division decided to implement a new system using VTScada software from Trihedral Engineering Limited. Utesch was understandably disappointed. "I had just put so much time and effort into that system."

Utesch wanted to make sure that the new system would not need to be replaced again a few years down the road. Years of working with control and monitoring equipment and his recent experience with SCADA software gave Utesch some very clear ideas about what features a mission-critical SCADA system absolutely had to have. Glenn Wadden and Barry Baker from Trihedral Engineering spent three days installing VTScada, connecting the I/O devices in the field and creating new application pages. During that time, Utesch made sure that they knew exactly what he expected from this new application. He was determined that this time Altamonte Springs would find the right SCADA software. In this article, Utesch describes his priorities for the new system and how they were reflected in the finished application.

'Hot Standby' with Automatic Failover

In the context of a SCADA system, 'redundancy' or 'hot standby' refers to the ability of one computer server to take over for another if it should fail or lose communication. "I wanted to have a hot standby with an automatic switchover and the [previous] software couldn't do that at the time. So I had devised a series of scripts and hard-wired relays to make that happen." This combination produced the desired result but was complicated to set up and difficult to maintain. The new approach was much closer to what he originally had in mind. "In the current system, it's all in the software." Adding redundant servers now involves selecting them from a dropdown list of available servers on the network.

"We are using five servers. Two of them are in the same building; each attached to a radio. These machines are looking at each other on the network. When the primary loses contact, the secondary picks up." To prevent costly overflows and spills, it is important that this transition be seamless and not require human intervention.

An added benefit was the ability to distribute the computing workload across the other three servers that are spread out in separate buildings across the campus. "All the services that aren't associated with polling are farmed out to those other machines. Let's say, for example, that the number three server is the Log Manager and number four server is its backup. Number four is also the Alarm Manager and number five is its backup. Each server has a primary function and can also backup another server."

A Unified Solution

The Water and Wastewater groups had been using the same brand of Remote Telemetry Units (RTUs) for monitoring and control in the field. "Originally we were using a product called Aquatrol, which was produced by a Minnesota-based company."

These units came with DOS-based Human Machine Interface (HMI) software that was used in the water plants, wastewater plant and all the lift stations. "Then I went one step further in the wastewater plant and added another layer on top of that." This was the SCADA software Utesch had just implemented. "It was a multi-layered software system. I would access the Aquatrol software with the SCADA software to get the information." The end result was that operators in the Water group accessed telemetry information from the field devices using different tools.

Organizational changes at the utility necessitated a single software interface for all operators. "They had recently combined the Water and Wastewater groups. We got dual licenses so the operators could perform both functions. Water and wastewater are both monitored from our base of operation at the wastewater plant."

Integrated Trending and Data Logging

This 'layered' combination created other issues as well. "The [previous] SCADA system wasn't as reliable for things like data logging and trending because it was relying on the other software to do those things." As a result, their operating license required them to have personnel on site at each of their water plants for up to eight hours a day.

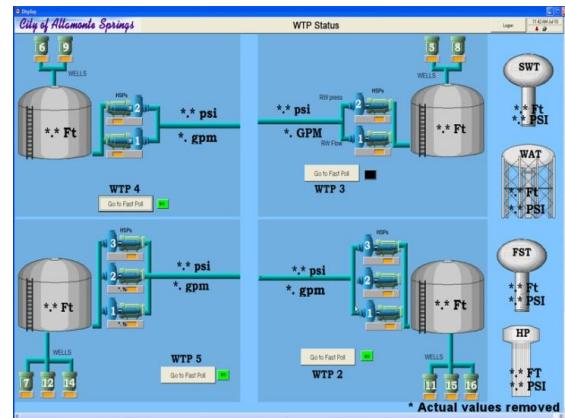
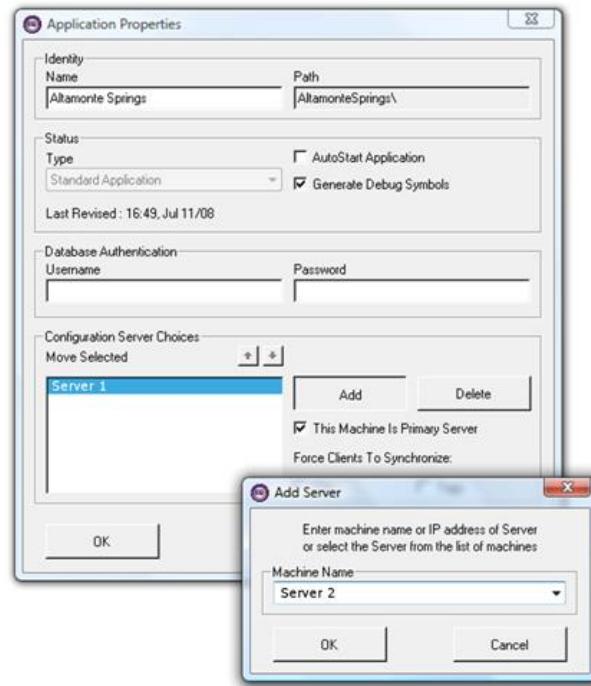
Trihedral's system included logging and trending tools that were integrated directly into the software. This eliminated the instability created when one kind of software needs to share services with a very different kind of software.

"That gave us the confidence to go to the regulatory board and say, 'This is the system we have now. This is how our information is coming back. These are our logging and trending capabilities.' As a result, we were allowed to relax our licensing so operators only need to spend about an hour a day at the plants. That is a lot less taxing on the operation."

Customizable

Once Glenn Wadden and Barry Baker had installed the new SCADA system, Utesch started putting it through the paces to make sure it wasn't missing any key functionality that he knew he was going to need. "I would say, 'It can't do this or it doesn't do that.' Glenn Wadden would go back to the hotel and come back the next day and say, 'Well now it does.'"

Utesch was particularly concerned about VTScada's integrated alarm notification system. "We generate a lot of alarms through our preventative maintenance so we didn't want the auto dialer to call out fifty times for one alarm. At the time, that was how it was designed to work. We had been using an archaic software product that did exactly what we wanted. It would call out multiple alarms to multiple numbers in one phone call. When I pointed this out to Glenn, he came back the next morning and said, 'Let's try it.'" From then on, it performed exactly as required with the added benefit of being built right into the system. "From a software administration standpoint, it's so much more convenient." This functionality is now a standard feature of the VTScada Alarm Notification System.



Very quickly, Utesch began using their full-development software license to build his own tags and application pages. With any HMI or SCADA system, it is important that the utility not be reliant on the software vendor or a systems integrator to make these kinds of adjustments and additions.

"There is one page that doesn't get used very much but I'm rather proud of it. We have a touchscreen HMI on our filtering system. It's a series of SCADAPack PLCs tied together with this touch screen. Somebody else had programmed that and created all of the screens. I essentially took those screens and reproduced them so now when using the filtering system in VTScada they see exactly what they would on the touch screen. They can operate it with their mouse just like they would on the touch screen. It functions exactly the same. That one took me some time and energy, but in the end it was worth it. Most of the stuff I do is to make the operators' lives easier so they don't have to do so much leg work."

Open Architecture

"When Glenn and Barry came down, we were doing a full-scale replacement of the Aquatrol RTUs with SCADAPack PLCs. There had been a fire at the Aquatrol facility and all of their records were gone. We knew that there was going to be no more support for that product. We had lots of spares on hand that we could have used for several years but we get so much lightning here in Florida that you never want to take that chance."

"We did all the lift stations first because they were less critical; we did the water plants next and then the wastewater plants." As they moved further long with the conversion process, it became more and more complicated to communicate with the Aquatrol units that were still in place. Once again, Utesch and the rest of the team came up with an ingenious interim solution. "We were transmitting on VHF radios to the Aquatrol units that were still in the field. Each of those RTUs was hard-wired to a SCADAPack PLC that sent the information back to the primary monitoring system on a 900 MHZ radio system. It was a delicate and complex system when we started using VTScada."

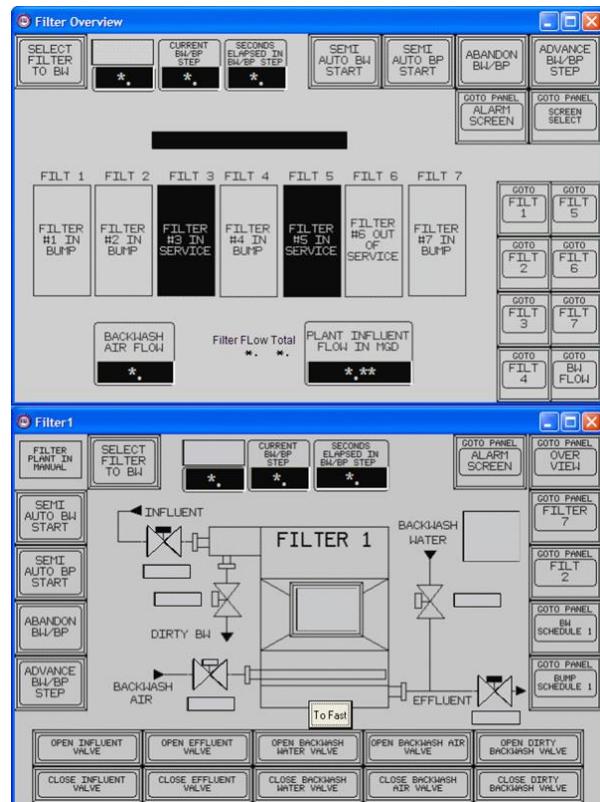
Once the new SCADA central was up and running, it was able to communicate with the various RTUs, PLCs and radios in this hybrid system for the duration of the changeover using an integrated library of device drivers.

On-line Configuration

"With some software you can't make 'hot' changes. You actually have to restart the program for the changes to take effect." The new SCADA system allows Utesch to perform functions such as modifying tags or creating new application pages while the application continues to perform its monitoring and control duties. "In today's industry you have got to be able to make changes on the fly."

Reliable Technical Support

"One of the things I know I can count on in this industry is that things change on a day-by-day basis." It is for this reason that Utesch insists on keeping his support contract up-to-date. "I'm just one of those people who believe that's just how you have to do it. There are very few places that you deal with that have good support. Dell computer is one of the finest in the world for its support. That's why when I buy a computer, I wouldn't even look at anyone else and when somebody asks me what to buy I don't say anything but Dell because of their support. I say the same thing about Trihedral. When they came down and showed me the kind of support that they were willing to offer, it was a no brainer. We absolutely have to maintain that support contract forever. They have always jumped through hoops to make whatever problem I have, big or small, go away. In this industry you don't often find that, so when you do, you tend to stick with it."



The Future

Utesch has continued to expand his system to meet the growing needs of the City. "There are always things coming up. We just incorporated the emergency backup generator into the application so operators can start and stop the generators when the power company calls and asks us. We just refitted a water plant. That was a big thing for us. We got to try some new things there like connecting our devices using fiber instead of hardwires or radios."

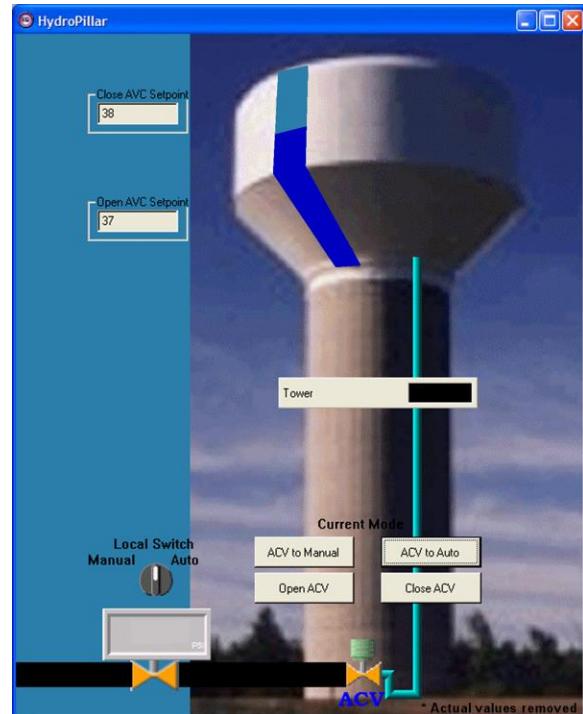
Utesch sees new challenges for their SCADA system on the horizon. "The city is running out of room to put people so they have to start going up instead of out. It really changes the system when you increase the population per square foot. It changes your flows dramatically. A lot more alarms are going to be generated as demand overcomes the capacity of some of these lift stations. There is a lot of forward planning that is going to need to happen."

For now at least, Utesch is confident he has the right SCADA system to deal with these issues as they arise. "Everything that I could come up with that I wanted the system to do, they made it happen. Finally, I said; 'Well, alright. You sold me.'"

Try It for Yourself

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